# The Effect of Imagery and Relaxation / Imagery Training on Rugby Players' Self-efficacy, Anxiety and Performance in Tackling

by

Angela J. Todd (nee Peebles)

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# ABSTRACT

Volunteer male rugby players (n=30) were assigned to one of three conditions: Relaxation and imagery training, imagery only training or a control group. The subjects were required to complete self-efficacy and state anxiety questionnaires, prior to and on the completion of imagery training. When the intervention was completed all subjects were required to perform three front-on tackles. The subjects were subsequently rated on their tackling performances. Both imagery training groups had significantly higher self-efficacy and expert rated performance when compared to the control group. There was no significant differences found between the three groups in anxiety or self-rated performance. The two treatment groups did not differ significantly in any of the dependent measures. A positive correlation was found between self-efficacy and performance and a significant negative correlation was found between anxiety and performance. However, no significant inverse relationship was found between anxiety and performance. These results provide support to the possible merits of imagery training and provide partial support to Bandura's (1977a) theoretical model of self-efficacy. Pratical implications and directions for future research are discussed.

# CHAPTER ONE

# INTRODUCTION

" Everything I vividly imagine I know I can achieve. " -Ian Ferguson (Sports Monthly magazine, March 1992)

Self-confidence or the belief in ones own abilities has long been regarded amongst athletes and coaches as an important factor in achieving maximum performance. Therefore, there is no surprise when top athletes exude self-confidence. For example, Martin Crowe, New Zealand cricket player and captain, said in an interview at the height of his cricket career. " I think the difference is that I've got a little bit more inner belief in myself to set a goal and achieve it." ( Sports Alive Magazine, Summer 1990)

The popular view point concerning confidence is that it is an elusive quality - you either have it or you don't. However, recently in the sports literature researchers have begun to address this issue by not only looking at the relationship between an athlete's self-confi-

dence and performance but determining whether feelings of confidence can be modified or manipulated through various interventions. A number of techniques and strategies have been advocated by researchers to help improve the confidence of athletes. One of these strategies is imagery training. This usually involves getting the athlete to mentally rehearse a physical skill in their mind a number of times over a period of time.

The effect of imagery training on confidence has received little attention in the sports literature. Therefore, the issues addressed in this thesis are:

1. Is there a positive relationship between self-confidence and sports performance?

2. Is it possible to enhance a persons confidence through imagery training?

3. If confidence is enhanced does this lead to better sports performance ?

# CHAPTER TWO

# REVIEW OF THE LITERATURE

Research on self-confidence in the sports domain began with an investigation into whether or not self-confidence actually played a vital role in sports performance. Therefore, the review of the literature will begin with a look into the relationship between confidence and sports performance. Much of the research that investigates the relationship between self-confidence and performance in the sports domain uses Bandura's model of self-efficacy as its theoretical underpinning. Therefore, included in this review will be brief explanation of his theory. Researchers then began to examine the resiliency of self-confidence; that is, they questioned whether self-confidence could be influenced by extraneous variables. Research that investigates the manipulation or modification of self-efficacy and subsequent effect on sports performance will therefore also be discussed. This research also tests the validity of Bandura's theory.

Mental training programmes for athletes have recently begun to receive attention in the literature. One mental training programme that has been investigated is visuo-mental behavioural rehearsal. The effect of this programme on sports performance and its relationship to self-confidence will be discussed.

## 2.1. THE RELATIONSHIP BETWEEN SELF-CONFIDENCE AND PERFORMANCE.

If confidence is an important factor in determining sports performance it would be expected that elite athletes would display higher degrees of confidence when compared to the less successful athlete.

This has been found in many studies across a variety of sports. Mahoney and Avener (1977) in a study of 13 male gymnasts found that among other psychological differences, olympic gymnasts displayed higher levels of confidence than those athletes who failed to make the team. Meyers, Cooke, Cullen and Lilies ( 1979) replicated these findings among elite racquetball players. Other studies have

also shown a positive relationship between confidence and sports performance. Gould, Weiss and Weinberg, 1981, wrestling; Highlen and Bennett, 1979, wrestling; Barling and Abel, 1983, tennis; Ness and Pattons, 1979, weightlifting. All these studies demonstrate a positive relationship between self-confidence and performance. However, because these studies employ a correlational design, a causal relationship cannot be inferred. That is, it is difficult to determine whether an athlete's elite performance was a result of their high degree of confidence or whether they were more confident due to their previous successful performances. As Mahoney (1979) notes, these studies were either correlational in nature or failed to isolate several experimental components so it is difficult to conclude that the expectation effect caused the performance increases.

Other problems in these studies are that they involve small, limited samples, making generalisations difficult. In addition, many studies use devices to measure self-confidence or efficacy that have not had their reliability or validity determined.

## 2.2. BANDURA'S THEORY OF SELF- EFFICACY.

Self-efficacy has been defined by Bandura as a situation-specific form of self-confidence. Self-efficacy refers to an individual's conviction that he or she can successfully execute the behaviours required by a particular situation. Self-confidence on the other hand, is viewed as a trans-situational stable personality characteristic. Accordingly, athletes' self-efficacy expectation can vary across situations. For example, a rugby player may be highly efficacious when faced with tackling an opponent who is smaller and less experienced than him or herself. However when tackling a larger, more experienced opponent, their self-efficacy expectation may be lower. Self-efficacy according to Bandura has a powerful influence on a person's choice of activities, their effort, level of persistence and subsequent level of performance. This is providing the necessary skills and motivation are present.

**Studies that Attempt to Modify and Manipulate an Athletes Self-efficacy.**

Besides the above principles concerning self-efficacy, Bandura proposed that there are four principle sources of information that influence efficacy expectations. These sources of information and relevant research will be discussed below.

***i. Performance Accomplishments.***

Bandura argues that the more successful one is at performing a specific task the more positive is one's efficacy expectations. Feltz and Landers (1979) investigated this hypothesis by looking at the effectiveness of participant, live and videotaped modelling on a basic back dive task. Participant modelling involved a model's demonstration and guided participation. In this condition subjects were guided through dives to insure they successfully performed the task.

In this study it was found that those subjects in the participant modelling condition performed better and had higher levels of self efficacy than the subjects in the live modelling or the videotaped

modelling treatment groups. These results confirm Bandura's hypothesis that successful performance has a positive effect on one's efficacy. These results were replicated in McAuleys's (1983) study.

***ii. Verbal Persuasion.***

Bandura also asserted that a person's efficacy expectations are influenced by verbal persuasion. These are verbal suggestions used to convince the sports person that they can perform a particular task. This technique is often used by coaches when encouraging athletes, for example, saying "I know you can do it."

Another way of influencing self-efficacy expectations is through performance deceptions. This is a technique that was used in Ness and Patton's (1977) study. In this study it was found that weight lifting subjects can press more weight when persuaded to think that they were lifting less weight than they actually pressed. Pannelbaker and Lightner, (1980) found that individuals focusing their attention primarily on external cues (termed disassociation) traversed a cross country course faster than individuals focusing on

internal cues (termed association). In disassociation, individuals cut themselves off from bodily sensations by thinking about anything else but these sensations. By doing this activity, the athlete may be able to cope with the pain or boredom of the endurance activity (Weinberg, 1983). In Self-efficacy terminology this might be seen as a form of verbal persuasion. Several other studies have successfully manipulated self-efficacy through verbal persuasion or deception (Weinberg, Gould, Yukelson and Jackson, 1981 and Grenel, 1986).

***iii. Emotional Arousal / Physiological Arousal***

Bandura also ascertains that self-efficacy can be influenced by emotional arousal. According to Bandura (1977) "People rely partly on their state of physiological arousal in judging their anxiety and vulnerability to stress" (pg. 198). Furthermore Bandura suggests very high states of arousal or anxiety can have negative effects on performance. In particular some athletes who are experiencing high levels of anxiety may interpret this as fear that they cannot perform the skill successfully (low self-efficacy). Bandura, therefore ascertains that there is an inverse relationship between self-efficacy and

anxiety; if anxiety decreases, self-efficacy increases. Just as efficacy expectations are influenced by people's arousal, people's arousal can be modified by attributions, relaxation, bio-feed back, symbolic de-sensitisation and symbolic exposure (Bandura; 1977). However, Feltz and Mugno's (1983) study on back-diving contradicted Bandura's theory. In this study there was no reciprocal relationship found between physiological arousal and self-efficacy nor was there a reciprocal relationship found between physiological arousal and performance. These results supported Feltz's (1982) research

***iv. Vicarious Experience.***

Bandura also asserts that a sports person's self-efficacy can be modified through vicarious experience or watching another sports person perform the task successfully. Several studies have addressed this issue and confirm that an observer's self-efficacy can be influenced by watching another person successfully model a particular skill. Furthermore, models have powerful positive effects on self-efficacy especially when participant modelling is used. Partici-

pant modelling involves showing a model performing a task and then physically assisting the subject when he or she attempts the task. (Feltz, Landers and Raeder, 1982; McAuley, 1985; Ozer and Bandura, 1990). In addition studies have found that similarity of model, especially in terms of athletic ability enhance the modelling effect. (Corbin, Laurie, Gruger and Smiley, 1984; George, Feltz and Chase, 1992; Gould and Weiss, 1981)

Imagining one's own performance may be thought of as a similar source of efficacy information that could alter athletes performance beliefs. This assumes that mentally seeing oneself successfully performing the desired task may influence the sports person into believing that they can successfully execute a task.

Accordingly, imagery training has been suggested by Mahoney (1984) and Feltz (1983) as a technique to help to improve self-efficacy. However, the research on the effectiveness of imagery on self-efficacy is limited. Given the interest in psychological skills training programmes very few researchers have attempted to discern what cognitive and emotive strategies in particular would be useful in increasing self-confidence.

**Limitations in the research**

Perhaps the major limitation in the research concerning self-efficacy and sports performance, is due to the very nature of self-efficacy. As mentioned, self-efficacy is a situation-specific form of self-confidence, because of this it is difficult to generalise the results of any one study to the whole athletic population. This indicates the need for a wider variety of sports to be examined in respect to self-efficacy. Furthermore, it may be beneficial to look at self-efficacy across many skills within a particular sport.

The subject samples employed in these studies tend to be American college students, who may or may not be involved in sport. This makes generalisation of the results to the whole athletic population difficult.

The self-efficacy rating scales have also been the subject of criticism. These scales are based on the scale used in Bandura and Adams' (1977) study and as such they are often hierarchically structured. The problem of this type of scale is that it is said to strengthen the relationship between measurement and performance. For instance if subjects know that they can do the fourth task in the

hierarchy, they know they can perform all others below it.

**Conclusion.**

The above research provides partial support for Bandura's self-efficacy theory. In particular it seems that self-efficacy does have a significant effect on performance and these self-efficacy expectations can be modified.

## 2.3. IMAGERY REHEARSAL AND ITS EFFECT ON SPORTS PERFORMANCE

The effect of visualisation or imagery rehearsal on sports performance has recently begun to receive attention in the literature. Visualisation or imagery rehearsal is basically imagining oneself performing specific behaviours. The technique often employed by researchers and coaches for athletes is Visuo-motor behaviour rehearsal. Visuo-motor behaviour rehearsal is an imagery training programme that was developed by Suinn (1972,1976). VMBR involves three basic steps; relaxation, imaginal practice and imagery

rehearsal of a specific sporting skill with the intent of improving the skill with which it is performed.

In the first step relaxation is achieved by a series of deep muscle exercises. According to Suinn (1976) relaxation is crucial for achieving quality imagery.

In the second step imaginal practice, the aim is for the athlete to learn to consciously control the content of imagery until a carbon copy of real life occurrence can be generated. The type of imagery aimed for by the athlete is more than visual, it is also tactile, auditory, emotional and muscular. As Suinn (1976) writes " One swimmer reported that the scene in her mind changed from black and white to colour as soon as she dove into the pool, and she could feel the coldness of the water. " ( pg 40-41)

Once the athlete has become proficient at imagining, the VMBR procedure involves imaginal rehearsal of a specific sport skill. It is here that Suinn introduces the notion of transfer. The principle of transfer says that a skill that is initially practised in one condition will transfer proportionally to a new situation to the degree that the new situation is similar to the previous condition (Suinn, 1976). Imagery rehearsal

can directly mimic the game like atmosphere and experiences. According to Suinn this is the strength of imaginal rehearsal of sport skills and contests. Hence an athlete can use imagery rehearsal with specific techniques and systematically enhance performance, if imagined under gamelike conditions this procedure should facilitate transfer to actual competition.

**The use of imagery and Case Reports.**

VMBR has been shown to enhance performance in many case studies. In Suinn's 1976 study, Olympic skiers either participated in VMBR training or were assigned to a control condition. The subjects in the VMBR group did so well that they were used for all the races. Therefore, the difference in performance results between the experimental and the control condition could not be empirically tested (Suinn, 1976). The literature shows that several world class athletes attribute their success to imagery rehearsal (Jean Claude Killy, Jack Niclaus, Chris Evert Lloyd cited in Suinn, 1983).

However case studies do not add to scientific support for a number

for reasons:

1. The athlete may have been involved with other training techniques that may have been responsible for their success.

2. The success may be the result of years of effort and the addition of imagery training may be coincidental to success.

3. The athlete's belief in the value of imagery training with the expectation of success may work as a placebo and indirectly effect performance.

**Experimental Studies.**

VMBR has been found to enhance performance in a number of empirical studies ( Hall and Erffmeyer, 1983; Noel, 1980; Weinberg, Seabourne and Jackson, 1981; Griffith, Steel, Vaccaro, Allen, Karpman, 1985; Lee and Hewit, 1987.)

**Factors that May Effect the Utility of VMBR or Imagery Training programmes.**

***i. Subjects experience with skill.***

Noel (1980) assigned tennis players to either a control group or a VMBR group that received a ten day training session in relaxation and visualisation before a tennis tournament. The results showed no significant performance differences between the two groups. However the higher ability VMBR group achieved a significant improvement in the percentage of first good serves, whereas the lower ability group decreased in serving accuracy. This study may indicate that in order for athletes to improve their performance they must be familiar enough with the skill to be able to visualise it correctly. In Noel's study the more experienced players may have improved because they could visualise the skill of serving correctly whereas the other less experienced players may not be as familiar with the skill and therefore more likely rehearsing incorrect behaviours and hence becoming worse rather than better. This may indicate that if all subjects were given a good description there may be an improvement for both groups. Other studies have also found that mental

rehearsal is more effective when the athlete is more familiar with the task being imagined (Hall and Erffmeyer, 1983; Corbin, 1972).

***ii. Relaxation instructions Prior to Imagery Induction***

Suinn (1972,1976) suggests that in order for imagery to enhance performance it is necessary for the athletes to be relaxed prior to imagery induction. In a study by Weinberg, Seabourne and Jackson (1987) it was found that image vividness and controllability did not differ as a function of arousal as compared to relaxation instructions. Further, there was no significant difference in performance in a variety of activities involving co-ordination, endurance, strength and speed in karate performance as a function of arousal versus relaxation instructions prior to the imagery training. The only exception was that for sparring, relaxation instructions produced the best performance.

These results question the long accepted assumption that one needs to be relaxed if performance and imagery control are to be maximised. Weinberg et al. (1987) suggest that the best type of instruction preceding imagery may be dependent on the type of

activity employed, that is, relaxation may be beneficial for tasks requiring fine motor movements where as high arousal might be more helpful to endurance or strength tasks. In support of this contention Gray, Haring and Banks (1984) found in their study on a single subject college varsity football player that arousal induction was associated with higher ratings of imagery vividness and increased efficacy expectations compared to relaxation induction prior to imagery training. The imagery rehearsal activity in this study required speed, strength and endurance and hence seemed to be facilitated by increased arousal.

***iii. Period of Imagery Intervention***

Weinberg (1985) suggests that using imagery is a skill that needs to be learnt by athletes. Accordingly many studies when attempting to see if imagery enhances sports performance fail to show a positive effect because the intervention period has been too short. An example where subjects failed to improve in performance after imagery training was Epstein (1980 ) study . In this research the imagery induction was restricted to the athletes being told to imag-

ine the action of dart throwing. The subjects in this study failed to improve in dart throwing ability after imagery training. This lack of improvement, may be due to the short intervention period leaving the subjects unable to learn to use imagery effectively

***iv. Vividness and Controllability***

Vividness refers to the clarity and details of an image. A vivid imaginer can describe even the smallest detail. Controllability refers to how well a person can change or manipulate the details of the image.

How well a person can visualise and control an image may also effect the subsequent performance of the athlete. In a recent study Barr and Hall (1992) reported that elite rowers reported experiencing rowing images more vividly and with more control than their novice counterparts. Accordingly the less experienced rowers saw themselves performing incorrectly more often.

***v. Orientation of Imagery Use***

Another factor that may affect how useful imagery is, is of its 'orientation' by the athlete. This refers to whether the athlete has a more internal perspective or external perspective when using imagery. When a person uses an external perspective when using imagery they view themselves from the perspective of an observer (much like watching a video). Internal imagery or 'Kinaesthetic imagery is more life like as the person actually feels the sensation that occurs while participating in such activities. In addition the athlete sees or feels the activity from their own perspective.

The relationship of imagery perspective and athletic performance has been examined by Mahoney, Tyler and Gabriel (1987). They found several factors that differentiated novice and elite athletes in their use of imagery. One primary difference was that the elite athletes reported using more internally focused and kinaesthetic imagery where the novice relied more on the third person visual forms of mental imagery. Orlick and Partington (1986), Mahoney and Avener (1977) and Barr and Hall (1992) reported similar findings when comparing elite versus novice athlete or successful

versus non - successful athletes.

**Imagery Rehearsal, Confidence and Performance.**

In a recent study Feltz and Riessenger (1990) investigated the merits of in vivo emotive imagery on self- efficacy beliefs and performance on a competitive muscular endurance task. This study found that those subjects who received imagery exposure had significantly higher efficacy scores and significantly higher performance scores than those subjects who did not receive any imagery exposure.

**Conclusion**

The research indicates that there are intervening factors which may influence the effectiveness of mental rehearsal on sports performance. Factors which are regarded as important are skill level or familiarity with the imagined task, vividness and controllability of imagery, the type of instruction prior to imagery rehearsal , the time of the intervention period and finally the perspective from which the imagery is taken.

## 2.4. RATIONALE FOR PRESENT STUDY:

The research indicates that self-efficacy is positively related to sports performance. The research also suggests that self-efficacy can be manipulated or modified through various sources of information. However, research that looks at how self-efficacy can be improved through cognitive interventions is scarce.

Therefore, the purpose of this thesis is to determine whether self-efficacy can be modified through implementing an imagery training programme. Further, research indicates self-efficacy is an important predictor sports performance, providing the necessary skills and motivation are present. Therefore, it is assumed that if self-efficacy can be modified through imagery training this will have a positive transfer effect on sports performance. This will also be investigated in this study.

Recent research has questioned the hypothesis that subjects need to be relaxed in order for imagery to be effective. Therefore the present research will compare subjects who receive relaxation instructions prior to imagery and subjects who receive only imagery training, on their self-efficacy and sports performance scores.

In addition this research will attempt to address some of the limitations of previous research which looks at self-efficacy and motor performance by:

1. Drawing subjects from the general athletic population and not from the university setting.

2. By getting the subjects to perform a task relevant to their sport rather than an irrelevant physical endurance or technical task.

3. Using a more general measure of self-efficacy and not a hierarchical scale.

4. By implementing an imagery training programme which takes into consideration results of previous research by:

a. Asking the subjects to imagine the task from an internal or kinaesthetic perspective.

b. By implementing a programme which will give the subjects time to learn how to use imagery.

c. By giving all the subjects a detailed description of the task so they will be equally familiar with the task.

This thesis differs from most previous research on self-efficacy and sports performance by:

1. Investigating the effect of imagery training as a potential source of information to modify self-efficacy.

2. Examining a "typical" New Zealand sport in New Zealand conditions.

## 2.5. HYPOTHESES:

Based on the literature review and the above rationale the following hypotheses were derived:

Hypothesis 1:

The Relaxation/ Imagery group and the Imagery only group will have significantly higher self-efficacy scores than the control group.

Hypothesis 2:

The Relaxation/ Imagery group and the Imagery only group will have significantly higher self-rated performance scores than the control group.

Hypothesis 3:

The Relaxation/ Imagery group and the Imagery only group will

have significantly higher judge rated performance than the control group.

Hypothesis 4:

In addition to these hypothesis a comparison will be made between the Imagery only group and the Relaxation / Imagery group on the dependent measures of performance, anxiety and self- efficacy. From the results of previous research (Weinberg et al; 1987 and Gray et al; 1984 ) it is hypothesised that the Relaxation and Imagery group will not score better, when compared to the Imagery only group, on any of the dependent measures.

Research Question:

According to Bandura's model of self-efficacy, the variables of self-efficacy, anxiety and performance are all co-related, these relationships will also be investigated in this study.

# CHAPTER THREE

# METHOD.

## 3.1. MATERIALS.

**Relaxation and Imagery training programme:**

This programme was modified from Suinns' (1986) "Seven steps to peak performance manual." This programme was chosen as it has already been used in the sports literature and it is readily available to sports athletes. The modified programme takes approximately four hours over a week period. This programme involves four stages.

1. Relaxation through a centring process.
2. Visualisation of a relaxation scene.
3. Visualisation of the competition scene (rugby game)
4. Using imagery to help achieve a specific goal. In the present study the goal will be to perfect the front-on tackle.

**Imagery training programme:**

This programme basically follows the same format as the previous condition but there is no relaxation induction. Furthermore, the second stage of the programme ( visualisation of the relaxation scene ) has been deleted from the programme and replaced with visualisation of a familiar scene.

## 3.2. SUBJECTS.

30 male rugby players were randomly assigned to one of three groups . The subjects came from a variety of grades ( senior, senior b, under 21, under 19 and under 18 grades). The only pre-requisites were that the subjects had no prior formal psychological training and were presently playing foot-ball. All players were volunteers from on campus advertising. To provide an incentive to participate in this study all subjects were told they would be put into a pool where they had one chance in 30 of winning a 50 dollar prize.

After the first phase of the study 3 players were unable to continue

due to injuries (2) and illness (1). Subsequent analyses was conducted on 27 players 8 in the control group, 9 in the relaxation and imagery training group and 10 in the imagery training group.

### 3.3. TASK.

The target task in this study is the front on tackle. This task was chosen as after discussion with a number of rugby players it was felt that a high degree of confidence is needed to perform it well. Furthermore, even though front on tackling can be regarded as a relatively hard task, it is felt anyone who has played rugby would have the necessary physical skills required to do it.

### 3.4. PILOT STUDY.

A pilot study was conducted on 37 schoolboy rugby players average age was 16 years.

After the research was completed it was felt due to the low numbers of subjects who actually completed the mental training programmes

and the logs within the programmes that they were too long and involved for the players. Those who had completed the programme were found to be interested in improving their rugby performance and in the benefits of mental training. Accordingly, the present study used only volunteers and a shortened version of the mental training programmes.

In the first study to induce relaxation the training programme used the Jacobson (1938) technique from Suinns' (1986) manual. This was found to be time consuming for most of the subjects. This technique was replaced with a technique called centring. This is a quick and effective way of achieving relaxation and concentration. To test the effectiveness of this relaxation technique 10 subjects rated their level of relaxation on a seven point scale prior to and after performing the exercise. All of the subjects achieved a greater sense of relaxation after the exercise. ( $t = 3.839$, $df = 9$, $p < .01$)

The pilot test confirmed that the directions were clear and there was enough time allocated for completing the rugby efficacy and anxiety measures .

The pilot test confirmed that the questionnaires were readable and

easy to complete for the subjects .

However the self-rating schedule which were completed after each tackle were found to interrupt the smooth running of the experiment. This rating schedule was replaced with a single 7 point rating on how successful they thought each of their tackles were, this was to be filled out at the completion of their three tackles.

### 3.5. INTER- RATER RELIABILITY.

The researcher selected four different tackles on the video-tape of the players in the pilot test. These were shown to the raters together. The researcher then asked the raters to evaluate the tackles on the video-tapes using the rating schedules provided, individually. After this was completed the researcher directed the raters to discuss the differences between their ratings and the reasons for these differences. They were asked to try and reach an agreement on each of the items in the rating schedules. The researcher then asked the raters if they thought if any items in the schedule caused any problems in particular. All of the raters felt the items were rela-

tively simple to rate especially after discussing it with the other raters.

The researcher asked the raters if they felt in any way that they could be biased in their ratings. The raters stated they felt the items were objective as it made them concentrate on different aspects of the tackle. This was because they were concentrating on these aspects they felt they would not be influenced by the size, look or past reputation of the player if they recognised them.

After this the raters had to rate 10 tackles individually, the scores were correlated and there was an inter-rater correlation of .841 - .945

## 3.6. EXPERIMENTAL CONDITIONS:

### Relaxation and Imagery Training Group ( RIG)

The subjects in this experimental group underwent relaxation and imagery training.

### Imagery Training Only Group (IG)

This followed the same format to the previous condition but without relaxation induction.

**Control**

In this group the subjects were described the target task in detail as in the previous conditions. These subjects were not required to take part in any of the imagery or relaxation training sessions.

## 3.7. DEPENDENT MEASURES:

### Rugby Efficacy measure: (REM)

This was designed to assess efficacy expectations for rugby tackling performance.

As there is no standardised self efficacy measure for rugby tackling a questionnaire was established. This was done by obtaining information from the rugby union on how to perform accurate front-on tackles. The description of the front-on tackle was given to two senior players and one senior coach and they were asked whether they thought this description constituted a good front-on tackle, they all agreed that it did. The description was also given to all of the players participating in the study and it was headed "Guidelines for performing the front-on tackle." This was to ensure all players participating in the study were equally familiar with an accurate front-on tackle.

From the description received from the union several major compo-

nents were identified by the researcher with the help of a senior rugby player. In this measure subjects are asked how certain they are of achieving certain aspects of a front-on tackle.This is done using a seven point likert scale, where <7> indicates the subject is highly certain of being able to perform the skill and <1> indicates the subject is highly uncertain of being able to perform the skill. Self-efficacy cognitions was assessed by totalling these certainty ratings across items and then dividing it by the number of items in the scale.

**Performance:**

The performance measure was based on the subjects performance on three front-on tackles following the intervention period. The three tackles were video-taped and rated by three independent judges. This procedure (video-taping) assured that the judges remained blind to the treatment conditions. The judges were all experienced players and two were rugby coaches and hence familiar with what constitutes an effective and accurate front-on tackle. Judges rated performance on a scale looking at various aspects of the front-on

tackle established in the previous questionnaire, on a <7> point scale with <1> representing poor performance and <7> representing excellent performance. Performance for each tackle was assessed by totalling the performance ratings for all the aspects of the tackle and then dividing this score by the number of items in the scale. The scores for each tackle was averaged to give a final performance score. Therefore, those subjects who scored highly in this measure would have done better tackles than those subjects who had lower scores.

**Self-rating Scale:**

Subjects were also required to complete a scale following their third performance trial which would indicate their perceived level of success in their 3 tackles. Responses were indicated on a <7> point likert scale.In this scale <1> indicates the subject had felt very unsuccessful and <7> will indicates he felt his performances were very successful.

**Rugby anxiety measure: (RAM)**

This measure is modified from the sport competition anxiety test (SCAT, Martens, 1977). Scat is an anxiety test designed to measure a sportsperson's predisposition to state anxiety in competitive sporting situation. State anxiety refers to an existing or immediate emotional state characterised by apprehension and tension. This test has been shown to have high construct validity ( Martens, 1977; Martens and Simons, 1979) and to be a better predictor of behaviour than some other trait anxiety measures. (Martens and Simon, 1979; Gerson and Deshales, 1978) This test was modified to test state anxiety in a specific situation of rugby tackling and uses a seven point likert style response schedule.

To avoid response set some of the questions were asked in the negative.

Anxiety was measured by totalling the anxiety ratings across the items and then dividing this total by the number of items in the scale.

Therefore those subjects who scored highly in this measure were more likely to feel anxious about tackling than those who scored lowly in this measure.

### 3.8. PROCEDURE:

Before the subjects underwent training they were required to complete an informed consent form and the rugby efficacy measure and rugby anxiety measure. All of the subjects received the same directions prior to their filling out the questionnaires. "I would like you to fill out the informed consent form and the rugby assessment measures provided. The questionnaires have items which ask you feel about different things when playing rugby. Be as honest as you can and remember all results will be kept confidential. Be very careful when filling out the questionnaires as some of the responses have been reversed, so you must think about every question carefully before responding. The questionnaires should not take long to complete." Before the subjects started their training the target task was described to them in detail. The subjects were told this is how you would perform an effective and accurate front-on tackle. This

was written for all the subjects. This ensured the subjects were equally familiar with an accurate front-on tackle.

The subjects were randomly assigned to relaxation/ Imagery training group, imagery only training group or the control group when they agreed to participate in the study. After completing the rugby assessment measures they were given the appropriate programme or no programme to do during the following week. After completing the treatment phase each subject was required once again to complete the rugby efficacy and anxiety questionnaires.

During the training period the subjects were asked not to practise the skill under investigation. This was that successful or unsuccessful accomplishments would not have any effect on the subjects' self-efficacy during the intervention period.

All the subjects were required to perform three front-on tackles. These tackles were video-taped and rated by three independent judges. After performing the tackles the subjects were required to complete a self- rating scale.

During the training the subjects in the intervention groups were required to keep a log detailing all of their imagery training along

with how well they were achieving relaxation. This served as a manipulation check.

# CHAPTER FOUR

# RESULTS

The data were analyzed in two phases.

The first phase examined the effects of the treatment conditions upon self-efficacy, anxiety, performance and the self-rating of performance.

The second phase of the analysis explored the relationship between the dependent measures of self-efficacy, anxiety and performance and hence looked at the fit of these data to Bandura's model of behavioural change.

## 4.1. PRE- TREATMENT ANALYSES:

One-way Anovas were first conducted upon the pre- treatment dependent variables of self-efficacy expectations and anxiety. No significant differences were found among the groups on any of the pre-treatment dependent variables. The groups were therefore assumed to be equal prior to treatment, and subsequent analyses

were conducted on the post-treatment measures only. The manipulation check confirmed that all the subjects in the intervention groups completed their mental training programmes.

## 4.2. PRE AND POST TREATMENT MEANS - SELF-EFFICACY, ANXIETY AND PERFORMANCE: (Table One).

The pre and post-treatment means for anxiety, self-efficacy and performance are shown in Table 1. As can be seen, anxiety decreased slightly over time for the two imagery training groups but increased over time for the control group. Self-efficacy among the two imagery training groups increased over time where as the control groups self-efficacy scores did not appear to alter much. The two imagery groups have higher post - treatment means for performance than the control group.

## Table 1

**Descriptive Statistics for Anxiety, Efficacy Expectations and Performance.**

| Treatment | Anxiety (pre) M | Anxiety (pre) SD | Anxiety (post) M | Anxiety (post) SD |
|---|---|---|---|---|
| RIG | 4.08 | .94 | 3.44 | 1.11 |
| IG | 3.61 | .49 | 3.43 | 1.04 |
| Control | 3.58 | 1.03 | 3.93 | 1.03 |

| | Efficacy (pre) M | Efficacy (pre) SD | Efficacy (post) M | Efficacy (post) SD |
|---|---|---|---|---|
| RIG | 4.44 | .92 | 5.34 | .99 |
| IG | 4.6 | 1.13 | 5.75 | .38 |
| Control | 4.89 | .70 | 4.48 | .47 |

| | Performance M | Performance SD | Self-rated performance M | Self-rated performance SD |
|---|---|---|---|---|
| RIG | 6.15 | .55 | 5.34 | .77 |
| IG | 6.24 | .69 | 5.56 | .58 |
| Control | 5.27 | .45 | 5.19 | .94 |

## 4.3. ONE WAY ANOVAS- SELF-EFFICACY, PERFORMANCE AND ANXIETY.

Subsequent One way Anovas revealed significant differences among the groups for the following.

Self-efficacy (rem average): $F(2, 26) = 9.313$, $p < .001$

Performance: $F(2, 24) = 7.107$, $p < .0042$

Anxiety and self-rated performance;

There was no significant difference found between the three groups in anxiety or self-rated performance.

## 4.4. SCHEFFE - F TEST - SELF- EFFICACY, ANXIETY AND PERFORMANCE.

Scheffe - F tests were used to further investigate the differences among the groups .

Self-efficacy:

Both the relaxation and imagery group ($m=5.34$ ) and the imagery only group (5.75) had significantly higher efficacy scores than the control group (4.49 ). These comparisons were significant at the .05

level. No significant differences were found between the two intervention groups in their self-efficacy.

Performance:

The relaxation and imagery group (m=6.15) and the imagery only group (m= 6.24), performed significantly better than the control group (m=5.27). (Significant at the .05 level). There was no significant differences found between the two imagery training groups in their performance.

There was no significant difference between any of the three groups in self-rated performance or anxiety.

In summary, imagery training sessions resulted in increased efficacy cognitions and qualitatively better performance when compared to the control group. The two imagery conditions did not differ significantly in any of the dependent measures.

## 4.5. PEARSON-PRODUCT CORRELATIONS AMONG EFFICACY, ANXIETY AND PERFORMANCE.

The measures of self-efficacy and anxiety used in the analyses were post-treatment measures. The expert -rating of performance was used to represent the performance construct, since it was felt that this measure provided a more objective indicator of the rugby players performance on the task.

According to Bandura's theory of self-efficacy there is a positive relationship between self-efficacy and performance. The table below (See table two) does in fact show that in the present study efficacy and performance were positively correlated. This Indicates that subjects with a high level of efficacy performed better than subjects with a lower level of efficacy. Bandura's theory also indicates that there is an inverse relationship between anxiety and efficacy. That is as self-efficacy increases anxiety decreases. Results in the present study support this contention as there was a significant inverse relationship between anxiety and efficacy (- .48; significant at .05 level).

Finally, Bandura's theory states that there is an inverse relationship

between anxiety and performance. The results in the present study show no significant negative relationship.

**Table 2**

**Correlations among Efficacy, Anxiety and Performance Post-treatment**

| | Anxiety | Efficacy | Performance |
|---|---|---|---|
| Anxiety | 1.0 | -.48* | -.336 |
| Efficacy | | 1.00 | .391* |
| Performance | | | 1.00 |

* $p < .05$

df = 25

# CHAPTER FIVE

# DISCUSSION

The present study was designed to empirically evaluate the merits of imagery training in an experimental sport setting and subsequently evaluate Bandura's theory of behavioural change (1977).

## 5.1. IMAGERY TRAINING AND SELF-EFFICACY:

This study examined the effects of Imagery and Relaxation / Imagery training on self-efficacy. It was hypothesised that the subjects in the two imagery training groups would have higher self-efficacy scores than the

control group.

The results of the present study confirm that psychological procedures can be used to manipulate self-efficacy. In this study the Relaxation / Imagery and the imagery only group scored better in self-efficacy for tackling than the control group. This supports Bandura's (1977) contention that psychological procedures whatever their form can influence efficacy expectations.

These results are also consistent with previous research which has indicated that self-efficacy is not a non malleable personality disposition but can be manipulated by specific sources of information and situations such as modelling, verbal persuasion, and performance accomplishments. (For example; Feltz & landers, 1979; McAuley,1985; and Weinberg et.al; 1981)

Therefore, in the present study imagery training was found to be an effective way of impacting on rugby players feelings of self-efficacy. How imagery rehearsal actually influences efficacy expectations was not investigated in this study. However, it could be argued that once a person has rehearsed a skill effectively in their imagination, this may produce feelings similar to those that occur when a person has accomplished a skill successfully, hence increasing their self-efficacy. In addition, within the training programme, the athletes were told that imagery training has been shown in the past to improve athletic performance. The belief of the subjects in the effectiveness of imagery training and their own beliefs in the benefits of mental training may have also influenced the rugby players self-efficacy.

## 5.2. IMAGERY TRAINING AND ANXIETY:

In the present study there was no significant difference found between the three groups in anxiety. This is inconsistent with Bandura's theory of self-efficacy which postulates as self-efficacy increases there is a decrease in arousal. However, these results are consistent with previous research of Feltz and Mugno (1985) which also failed to find a consistent inverse relationship between anxiety and efficacy.

The failure of the imagery training programme to influence anxiety may be due to the type of task employed in the study. The tackling task the subjects were required to mentally rehearse could be regarded as quite stress provoking. For example the subjects were asked to "Imagine your opponent running directly at you."

This does not discount imagery training as an effective way of reducing state anxiety as it has been found useful in reducing anxiety in other sporting situations. For example, cognitive rehearsal was found useful in reducing state anxiety in scuba diving. (Griffith et. al; 1985)

## 5.3. IMAGERY TRAINING AND PERFORMANCE:

In the present study it was hypothesised that the Relaxation/ Imagery and the Imagery only training groups when rated by experts would perform better in tackling than the control group. The results support this hypothesis.

These results also supports previous research which has found VMBR and imagery training programmes to be an effective way of enhancing sports or physical endurance tasks. (Hall & Erffmeyer, 1983; Noel, 1980: Weinberg et.al., 1981; Griffith et.al.,1985; Lee & Hewit, 1987.)

A number of alternative arguments can be put forward to account for this enhanced performance.

It has been previously advocated that imagining an activity had some neurophysiological effect in "priming" the appropriate muscles. However Feltz & Landers (1983) concluded from a review and meta-analysis on this that mental imagery has its effects at the cognitive level rather than at the physical preparation level.

Another possible explanation for the results is that imagining oneself performing a sporting skill is similar to that of observing a model performing a sporting task. This mental representation may provide the internal model for successful response production.

Secondly, it could be argued that mental practice functions to assist the performer in psychologically preparing for the skill to be performed. Imagery training may facilitate performance by occupying the majority of the individual's attention before they perform the task. This means that distracting thoughts or images are prevented from interrupting their preparation.

Finally it could be argued that successful mental rehearsal is similar to that of physical practice and therefore producing similar feelings and physical reactions of a successful physical practice. One type of feeling it may produce is enhanced self-efficacy. Whether the imagery training groups' better performance was the result of this enhancement of self-efficacy will be discussed below.

## 5.4. IMAGERY TRAINING AND SELF-RATED PERFORMANCE.

In the present study no significant difference was found between the imagery training groups and the control group in self-rated performance. These results did not support the hypothesis as the imagery training groups were expected to have higher self-rated performance when compared to the control group.

The present study's findings were surprising considering the expert rating for the two imagery groups was better than that for the control groups. This result may be due to the self-rating of performance measure being of questionable reliability and validity. The measure was restricted to one question where the subjects were asked to rate how well they thought they performed. It could be argued that this did not require the rugby players to think about each aspect of their tackle, so oversimplifying the matter. Another possible explanation is that the rugby players were too modest to rate themselves at the top of the scale. (Central tendency effect.)

## 5.5. COMPARISON BETWEEN THE IMAGERY AND RELAXATION / IMAGERY GROUPS:

Further analyses on the dependent measures of self-efficacy, anxiety and performance revealed no significant differences between the Imagery training and the Relaxation/ Imagery group. Previous research of Weinberg et.al. (1987) and Gray et.al. (1984) indicates that the utility of relaxation prior to imagery training is dependent on the type of task employed. That is, relaxation prior to imagery training was found to be useful for those tasks which require a high level of technical skill and concentration. On the other hand, for skills which require a high level of strength or endurance relaxation training has been found to be of little use or even detrimental to performance. The task of tackling, while it does require some technical skill is not regarded as highly technical. Similarly, tackling if done correctly does not require a large amount of strength or endurance. This may suggest why relaxation prior to imagery for this task was of little use. These results also support previous research. (Weinberg, 1987)

The present study's finding do not discount the importance of relaxation training, prior to imagery, as it may be useful for sports which require a high degree of technical skill. Relaxation training may also be useful in its own right. For example, relaxation training may be useful for those people who are highly anxious or tense prior to competition and perceive this nervousness to be detrimental on their sports performance.

## 5.6. RELATIONSHIPS AMONG THE VARIABLES OF SELF-EFFICACY, ANXIETY AND PERFORMANCE.

Theoretically relevant variables in Bandura's model of self-efficacy were examined.

Self-efficacy theory postulates that when an individual is capable of a response and there are appropriate incentives for performance, then actual performance will be predicted by the individual's belief in personal competence. On the basis of this theory one would expect there to be a positive correlation between self-efficacy and performance. The results in the present study support this contention as a positive correlation between efficacy and performance was found.

These results are consistent with previous research which has found efficacy to be a strong predictor of performance. (Nelson & Furst, 1972; Ness and Patton,1979; and Mahoney & Avener, 1979 ). These results do not suggest that self-efficacy is the only predictor of performance. Performance can be mediated by many diverse mechanisms. (Bandura, 1984). Mechanisms such as self-evaluation, goal setting and self-efficacy are only a few of the mediating variables which can significantly influence performance. However, the results of the present study offer confirmatory support for self-efficacy being a significant predictor of performance in the sporting domain.

In the present study, since there was a positive correlation between efficacy and performance this may lend some support to the contention that the subjects in the imagery training groups better performance depended largely on changes in self-efficacy.

In addition to this Bandura suggests that an inverse relationship exists between self-efficacy and anxiety. That is, as self-efficacy increases anxiety decreases. Therefore, the results of the present study support this claim as there was a significant negative correlation found between efficacy and anxiety. These results are consistent

with previous research for example, McAuley; 1985. Furthermore, Bandura suggests that high level of anxiety can have a negative effect on performance. The results of the present study did not find a significant negative relationship between anxiety and performance. Previous research has also shown that high levels of anxiety are not always detrimental to performance (Feltz & Mugno; 1983).

These results are to be viewed with caution as they are based on correlational data.

The present research provides partial support for Bandura's theory of self-efficacy. However, previous research (Feltz; 1982, Feltz and Mugno; 1983 and McAuley; 1985) and the results of the present study suggest that a more complex model of Behavioural change is needed. Therefore there is the need for Bandura's model to be applied to more diverse sport settings and for statistical tools such as path analysis and structural equations analysis to be employed. This is necessary if researchers are interested in developing a more complete model of behavioural change and investigating whether specific data fit these theoretical models (McAuley; 1985).

## 5.7. LIMITATIONS OF THE PRESENT RESEARCH:

There are some major short-comings within this study, and as such, one must be cautious in interpreting the results.

Generalising the findings to performance in a competition sport is difficult due to the task used in the present study. Although rugby tackling is a normal part of the game, the experimental tackling task falls short of replicating the conditions experienced in a real game. For example, all subjects had the opponent running directly at them. This is unlikely in a normal game situation as the opponent is usually trying to avoid the tackler. Therefore, it would be useful if the results could be verified in a competitive rugby game.

Furthermore, due to the specific nature of the dependent measures of self-efficacy, anxiety and performance, common in the field of research into self-efficacy, generalisation to other sporting codes or even other skills within rugby is difficult.

As mentioned previously, the results of the present research confirm a positive correlation between self-efficacy and performance sug-

gesting that self-efficacy is a major determinant of sports performance. However, the results are based on correlational data and no cause - effect conditions can be drawn. It remains for future research to utilise appropriate causal analyses in assessing the influence of efficacy on performance. Research by Feltz (1982) and McAuley (1985) have implemented path-analytic techniques to investigate the interrelationship between modelling, self-efficacy and performance. These statistical analyses was beyond the scope of present research due to the small sample size employed in the research. Future research which utilises path-analytic techniques to investigate the relationships between imagery, self-efficacy and performance would be useful.

Another limitation in this study is the questionable validity and reliability of the dependent measures. There were no standardised measures developed to assess rugby tackling, self-efficacy and anxiety. Therefore, questionnaires were developed a new without established validity or reliability.

## 5.8. DIRECTIONS FOR FURTHER RESEARCH:

The results of present and previous research has indicated that self-efficacy is a malleable personality construct and can be influenced by various cognitive interventions and situations. The question is, what types of cognitive interventions are the most valuable for improving confidence and performance. Hence, there is need for future research employing a diverse range of sports and a variety of cognitive interventions to empirically evaluate the relationship between efficacy, the type of intervention and performance. With this type of research the versatility of the interventions can be assessed. Interventions which can be applied to a variety of sporting situations would be more useful than interventions where their effectiveness restricted to a particular sport or task.

Barr and Hall (1992) suggest that imagery training may have another spin off as a motivational function. In their research it was found that elite rowers often see themselves winning, these 'images' might work to motivate the rowers to practice longer and harder. Whether imagery training has other possible spin offs such as increased motivation, has not yet been investigated.

Given the growing interest in psychological skills training in the sports setting it is important that these interventions are positive experiences for the athletes in terms of performance, personal growth and enjoyment of their sport. Therefore, it would be useful for future research to employ measures which not only measure performance and confidence but look at the subjects' own views on how useful they feel specific inventions to be.

## 5.9. PRACTICAL IMPLICATIONS FOR ATHLETES AND COACHES

With the increasing pressures for performance excellence, the serious athlete is beginning to look at techniques to improve confidence and performance. The results of previous research and the present study suggest that imagery training may be the answer.Previous research has indicated that physical practice is superior to mental practice. However, if conditions are unsuitable for physical practice or if the athlete is suffering physical stress of injury, mental rehearsal is a good alternative, as mental rehearsal has been found superior to no practice at all. Further, mental rehearsal should be used as a valuable addition to physical practice. (Felts & Landers 1983)

It is common for athletes to use their own mental preparation techniques before competition. However, as Barr and Hall (1992) note it is necessary for these mental techniques to be presented in a systematic way before any benefits are reaped. In the present study, the strategies were presented to the subjects in a systematic training approach which may have been an important ingredient for their subsequent successful performance.

Further, it seems that athletes need to play an active role in the practice of their mental strategies. The intervention in the present study was basically a self-training programme which enabled subjects to gain a sense of responsibility and commitment, which may be an important ingredient for the enhancement of performance and confidence.

In conclusion, if athletes and coaches decide to implement an imagery training programme it is important to take into consideration previous research findings:

1. It is important that the athlete is given time so they can practice using imagery, and that control and vividness of images can be maximised.

2. Athletes should be provided with clear and concise information on how to perform the task correctly in as many forms as possible. For example, written description, videos or verbal descriptions. The more familiar the athlete is with the task, the more effective the imagery training will be.

3. Athletes and coaches should determine, by the type of task to be mentally rehearsed, whether relaxation procedures should be built into imagery training. ( Relaxation may be useful for tasks which are highly technical or are high in cognitive demand.)

4. When the athletes imagine themselves performing a skill they should try and use an internal perspective and actually feel themselves going through the movement. (Kinaesthetic)

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# APPENDIX A

# RAW DATA

| Condition | pre-rem average | rem average | pre-rat average | rat average | selfasses average |
|---|---|---|---|---|---|
| control | 3.909 | 4.000 | 4.000 | 4.500 | 3.667 |
| control | 6.000 | 4.909 | 4.000 | 4.375 | 6.333 |
| control | 3.818 | 3.545 | 4.625 | 4.750 | 5.000 |
| control | 5.273 | 4.445 | 1.625 | 1.625 | 5.333 |
| control | 4.818 | 4.818 | 4.000 | 3.875 | 6.333 |
| control | 4.545 | 4.364 | 2.750 | 3.750 | 5.000 |
| control | 5.273 | 4.455 | 4.375 | 4.500 | 5.000 |
| control | 5.182 | 4.818 | 3.625 | 4.875 | 4.000 |
| control | 5.182 | 5.000 | 3.250 | 3.125 | 6.000 |
| IG | 5.636 | 5.818 | 3.375 | 2.750 | 5.000 |
| IG | 5.364 | 5.636 | 4.000 | 4.750 | 5.667 |
| IG | 2.545 | 5.091 | 4.500 | 4.500 | 4.667 |
| IG | 4.455 | 6.182 | 3.500 | 4.500 | 6.000 |
| IG | 5.636 | 5.909 | 3.750 | 4.250 | 6.000 |
| IG | 4.364 | 5.636 | 3.375 | 4.250 | 5.333 |
| IG | 4.909 | 5.909 | 2.625 | 2.625 | 6.000 |
| IG | 3.909 | 6.364 | 3.375 | 2.500 | 6.333 |
| IG | 3.182 | 5.273 | 3.875 | 2.250 | * |
| IG | 6.000 | 5.727 | 3.750 | 3.875 | 5.000 |
| RIG | 5.273 | 6.364 | 4.250 | 2.875 | 5.667 |
| RIG | 5.000 | 6.182 | 3.125 | 2.625 | 5.000 |
| RIG | 2.636 | 3.273 | 5.625 | 4.750 | 6.667 |
| RIG | 4.091 | 6.182 | 3.250 | 1.375 | 6.000 |
| RIG | 3.636 | 5.364 | 2.875 | 3.500 | 4.333 |
| RIG | 4.818 | 5.364 | 4.750 | 3.750 | 4.667 |
| RIG | 4.909 | 4.909 | 4.250 | 4.250 | 5.667 |
| RIG | 5.182 | 5.091 | 4.500 | 4.375 | 5.000 |

| Condition | rem total | pre-rat total | post-rat total | pre-rem total | rating total average |
|---|---|---|---|---|---|
| control | 44 | 32 | 36 | 43 | 35.667 |
| control | 54 | 32 | 35 | 66 | 37.667 |
| control | 39 | 37 | 38 | 42 | 39.667 |
| control | 49 | 13 | 13 | 58 | 43.000 |
| control | 53 | 32 | 31 | 53 | 37.500 |
| control | 48 | 22 | 30 | 50 | 36.444 |
| control | 49 | 35 | 36 | 58 | 33.444 |
| control | 53 | 29 | 39 | 57 | 32.000 |
| control | 55 | 26 | 25 | 57 | * |
| IG | 64 | 27 | 22 | 62 | 45.778 |
| IG | 62 | 32 | 38 | 59 | 41.889 |
| IG | 56 | 36 | 36 | 28 | 44.000 |
| IG | 68 | 28 | 36 | 49 | 36.778 |
| IG | 65 | 30 | 34 | 62 | 48.000 |
| IG | 62 | 27 | 18 | 48 | 45.778 |
| IG | 65 | 21 | 21 | 54 | 48.111 |
| IG | 70 | 27 | 20 | 43 | 47.444 |
| IG | 58 | 31 | 18 | 35 | * |
| IG | 63 | 30 | 31 | 66 | 35.889 |
| RIG | 70 | 34 | 23 | 58 | 48.444 |
| RIG | 68 | 25 | 21 | 55 | 41.778 |
| RIG | 36 | 45 | 38 | 29 | 42.444 |
| RIG | 68 | 26 | 11 | 45 | 36.444 |
| RIG | 59 | 23 | 28 | 40 | 43.333 |
| RIG | 59 | 38 | 30 | 53 | 39.444 |
| RIG | 54 | 34 | 34 | 54 | 44.000 |
| RIG | 56 | 36 | 35 | 57 | 48.111 |

| condition | Rating average |
|---|---|
| control | 5.096 |
| control | 5.381 |
| control | 5.667 |
| control | 6.032 |
| control | 5.357 |
| control | 5.175 |
| control | 4.810 |
| control | 4.619 |
| control | * |
| IG | 6.524 |
| IG | 6.048 |
| IG | 6.333 |
| IG | 5.270 |
| IG | 6.857 |
| IG | 6.492 |
| IG | 6.873 |
| IG | 6.794 |
| IG | * |
| IG | 4.984 |
| RIG | 6.937 |
| RIG | 5.952 |
| RIG | 6.016 |
| RIG | 5.365 |
| RIG | 6.175 |
| RIG | 5.587 |
| RIG | 6.317 |
| RIG | 6.857 |

# APPENDIX B

# RUGBY ANXIETY TEST (RAT).

# Rugby Assessment Measure.

**Name:**_____ _____
(first name) (surname)

DIRECTIONS: Below are some statements people feel when they play rugby. Place a circle around the appropriate number to indicate to what extent you agree with the following statements.

1. Before doing a front-on tackle I would feel uneasy.

1_____2_____3_____4_____5_____6_____7
disagree agree
strongly strongly

2. When tackling I would be concerned about making mistakes.

1_____2_____3_____4_____5_____6_____7
sagree disagree
strongly strongly

3. I enjoy competing with others.

1_____2_____3_____4_____5_____6_____7
disagree agree
strongly strongly

4. Before tackling an opponent I would get a queasy feeling in my stomach.

1_____2_____3_____4_____5_____6_____7
disagree agree
strongly strongly

5. Before tackling an opponent I would feel relaxed.

1_____2_____3_____4_____5_____6_____7
disagree agree
strongly strongly

6. Before tackling an opponent I would feel nervous.

1_____2_____3_____4_____5_____6_____7
disagree agree
strongly strongly

7. Before tackling an opponent I would be concerned about performing badly.

1_____2_____3_____4_____5_____6_____7
disagree strongly — agree strongly

8. I like to compete in games that demand considerable physical energy.

1_____2_____3_____4_____5_____6_____7
disagree strongly — agree strongly

9. Before tackling an opponent I would get uptight.

1_____2_____3_____4_____5_____6_____7
disagree strongly — agree strongly

10. I find team sports more exciting than individual sports.

1_____2_____3_____4_____5_____6_____7
disagree strongly — agree strongly

11. I am calm before I am required to perform a front-on tackle.

1_____2_____3_____4_____5_____6_____7
disagree strongly — agree strongly

12. I am a good sportsperson when I play rugby.

1_____2_____3_____4_____5_____6_____7
disagree strongly — agree strongly

# APPENDIX C

# RUGBY TACKLING EFFICACY MEASURE (REM).

## Rugby Assessment Measure.II.

DIRECTIONS:By circling the apropriate number, rate how you feel about each of the following aspects of front-on tackling.

1. In a rugby game I am very confident performing front-on tackles.
(How true is this statement?)

1_____2_____3_____4_____5_____6_____7
very untrue — very true

2. How certain are you of making a good front-on tackle when the opponent is smaller than you?

1_____2_____3_____4_____5_____6_____7
very uncertain — very certain

3. How certain are you of making a good front-on tackle when the opponent is larger than you?

1_____2_____3_____4_____5_____6_____7
very certain — very uncertain

4. How certain are you of maintaining a low body position when front-on tackling?

1_____2_____3_____4_____5_____6_____7
very uncertain — very certain

5. How certain are you of keeping your eyes open until point of impact when front-on tackling?

1_____2_____3_____4_____5_____6_____7
very uncertain — very certain

. How certain are you of keeping good balance when front-on ackling?

_____2_____3_____4_____5_____6_____7
ery very
ncertain certain

'. How certain are you of stopping the opponent when front-on tackling.

1_____2_____3_____4_____5_____6_____7
very very
certain uncertain

8. How certain are you of performing a good front-on tackle when the opponent is the same size as you?

1_____2_____3_____4_____5_____6_____7
very very
uncertain certain

9. How certain are you of focusing on the tackle zone (the point of contact between you and your opponent) until the point of impact?

1_____2_____3_____4_____5_____6_____7
very very
uncertain certain

10. How certain are you of keeping your head to the side of the opponent when front-on tackling?

1_____2_____3_____4_____5_____6_____7
very very
uncertain certain

11. When front-on tackling, how certain are you of keeping your arms tightly wrapped around the opponent until you have successfully stopped them?

1_____2_____3_____4_____5_____6_____7
very very
uncertain certain

# APPENDIX D

# EEPERT RATING SCHEDULE

RATING SCHEDULE

Tackler number: _____

Name of rater: _____

DIRECTIONS: Indicate by placing a circle around the appropriate number between not at all successful and very successful, where you felt each player performed in the following aspects of the front-on tackle.

1. How successful was the player at stopping his opponent?

1--------2--------3--------4--------5--------6--------7
not at all successful — very successful

2. How successful was the player at keeping his balance?

1--------2--------3--------4--------5--------6--------7
not at all successful — very successful

3. How successful was the player at keeping a low body position?

1--------2--------3--------4--------5--------6--------7
not at all successful — very successful

4. How successful was the player at keeping his head to the side of the opponent?

1--------2--------3--------4--------5--------6--------7
not at all successful — very successful

5. How successful was the player at keeping his arms tightly wrapped the opponent during the tackle?

1--------2--------3--------4--------5--------6--------7
not at all successful — very successful

6. How successful was the player at focusing on the tackle zone?

1--------2--------3--------4--------5--------6--------7
not at all successful very successful

7. How successful was the player at timing his tackle?

1--------2--------3--------4--------5--------6--------7
not at all successful very successful

# APPENDIX E

# SELF-RATING SCHEDULE

## SELF-RATING OF TACKLES:

Indicate by placing a circle around the appropriate number between not at all successful and very successful how successful you felt each of your tackles were.

TACKLE ONE

1----------2----------3----------4----------5----------6--------7

not at all successful — very successful

TACKLE TWO

1----------2----------3----------4----------5----------6--------7

not at all successful — very successful

TACKLE THREE

1----------2----------3----------4----------5----------6--------7

not at all successful — very successful

# APPENDIX F

# IMAGERY TRAINING PROGRAMME

MENTAL TRAINING PROGRAMME. (Group 2)
INSTRUCTIONS:

**Name:** _____ _____
(first name) (surname)

**Age:** _____(yrs) Yrs Experience _____

This training programme has one objective: To enable rugby players to enhance their performance through mental training.

Imagery training has been found in a series of laboratory and field studies to be a valuable technique for enhancing athletic performance.

PROCEDURE: 1. You should first scan over the whole training programme for a general overview of what it involves.

2. Scan over the first stage.

3. Return to the beginning of stage one exercise and follow the programme outlined.

4. Follow this procedure as you continue with the programme.

5. As you continue with the programme use the training logs to keep track of your progress

As with any other training procedures, mental training skills are acquired one step at a time. Be patient and consistent in your practice.

# IMAGERY TRAINING:

The use of imagery is one of the most powerful tools you can use to achieve peak performance. Visualisation enables you to programme mind and body into a single unit. By preparing mind and body it gives you an extra edge. When visualising always be there as a participant (inside your body) and not as an observer (outside your body).

## STAGE ONE:

1. Pick a place where you won't be disturbed.
2. Now visualise a scene of familiar activity or situation. It might be a scene involving listening to a favourite record as you sit on a specific chair in your room, or a specific place you have visited.
3. Let this scene develop, allowing yourself to be there and using any senses that make the experience real for you.(Smelling, feeling, seeing, hearing, tasting.) Don't try to force the scene; as any details appear use these details to help the rest of the scene develop.
4. Allow your senses to enable you to be aware of being in the scene, such that you are truly there. Retain the scene for 30 seconds.
5. Now switch off the scene. Count to 10.
6. Switch on the scene again. Retain it and be there for 30 seconds.
7. End the training session.

Repeat stage one training twice in one day. You might like to do one session in the morning and one session at night. Complete training log at the end of each session.

## TRAINING LOG FOR IMAGERY EXERCISES:

### STAGE ONE:

Session one

Rate how vivid and realistic your familiar scene was by circling the appropriate number on the scale.

1_____2_____3_____4_____5_____6_____7

not real at all — very real

Session two

Rate how vivid and realistic your familiar scene was by circling the appropriate number on the scale.

1_____2_____3_____4_____5_____6_____7

not real at all — very real

STAGE TWO:

SUCCESSFUL COMPETITION SCENE.

In all scenes, remember to always be there as a participant(inside your body) and not as an observer (outside your body)

Pick a place where you won't be disturbed.

1. Switch on your familiar scene or activity, and let it come realistically. Be in it for about 30 seconds.
2. Switch off the scene and count for 10 seconds.
3. Now switch on a success competition scene - a specific rugby game in which your body functioned at peak performance level. Let the scene be real and vivid, and be there again. Be in it long enough to experience the major parts of the successful movement.(For example, until the try was scored or until you successfully finished off a movement.)
4. Switch off the scene.
5. Repeat the success scene at least twice within a 20-30 minute session.
6. Practice stage two training twice in one day.

Complete training log at end of each session.

## LOG FOR IMAGERY EXERCISES:

STAGE TWO:

Session one

Rate how vivid and realistic your success competition scene was by circling the appropriate number on the scale.

1_____2_____3_____4_____5_____6_____7

not at all real — very real

Session two

Rate how vivid and realistic your success competition scene was by circling the appropriate number on the scale.

1_____2_____3_____4_____5_____6_____7

not at all real — very real

STAGE THREE:

You are now good enough in imagery rehearsal that you can apply it for different goals. Your goal is to be able to perform effective and accurate front-on tackles.

GOAL: To perform effective and accurate front-on tackles.

DESCRIPTION: When using imagery to practice front-on tackling: See your opponent running directly at you. Concentrate on focusing on the tackle zone.(The area between the knees and the waist). Encourage the opponent to run into your shoulder. Place your head to one side of your opponent and adopt a crouched body position. Keep your head well forward, legs well bent and back rounded. Wrap you arms tightly around the opponents legs and allow his momentum to carry both your bodies back and down. Retain a rounded back and perform a backward roll. Twist in the tackle so that you are on top when the tackle is completed.
Remember when imagining yourself front-on tackling, experience the feel, sights and sounds of it rather than watching yourself perform.

PROCEDURE: Think of a game or practice scene during which you would perform a front-on tackle.
1. Switch on a rugby game or practice scene, Visualising yourself performing a front-on tackle.

2. Notice the way in which your body moves and the general feel as you correctly perform the front-on tackle.

3. Switch off the scene.

4. Repeat this scene for a total of two more times. Make certain that the rehearsal involves correctly performing the desired movements. Remember you want to programme correct movements.

5. Switch on the success competition scene, experiencing the success feelings.

6. End the session.

Practice stage three imagery training three times within one day.

Complete training log at the end of each session.

TRAINING LOG FOR IMAGERY EXERCISES:

STAGE THREE:

Session one

Rate how realistic and vivid your tackling scene was by circling the appropriate number on the scale.

1_____2_____3_____4_____5_____6_____7

not at all real — very real

Session two

Rate how realistic and vivid your tackling scene was by circling the appropriate number on the scale.

1_____2_____3_____4_____5_____6_____7

not at all real — very real

Session three

Rate how realistic and vivid your tackling scene was by circling the appropriate number on the scale.

1_____2_____3_____4_____5_____6_____7

not at all real — very real

# APPENDIX G

# RELAXATION AND IMAGERY TRAINING PROGRAMME

**MENTAL TRAINING PROGRAMME.(Group 1)**
**INSTRUCTIONS:**

**Name:** _____ _____
(first name) (surname)

**Age:**_____(yrs) **Yrs Experience** _____

This training programme has one objective: To enable rugby players to enhance their performance through mental training.
Imagery training has been found in a series of laboratory and field studies to be a valuable technique for enhancing athletic performance.

PROCEDURE: 1. You should first scan over the whole training programme for a general overview of what it involves.
2. Scan over the first stage.
3. Return to the beginning of stage one exercise and follow the programme outlined.
4. Follow this procedure as you continue with the programme.
5. As you continue with the programme use the training logs to keep track of your progress

As with any other training procedures, mental training skills are acquired one step at a time. Be patient and consistent in your practice.

# RELAXATION TRAINING

## STAGE ONE

This training involves learning how to relax through a process called centering. Centering is a method to achieve relaxation by centering your attention on a stomach breathing exercise.

Select a quiet place where you wont be disturbed

1. With your eyes closed, stand or sit with your shoulders relaxed.

2. Take a slow deep breath, drawing in the air by your stomach moving outward; slowly exhale by your stomach moving inward.
Repeat taking the deep breath a total of three times.
Center your attention on this breathing process.

3.Scan your muscles to determine if any tension remains in spots, then use the centered breathing to flow the relaxation to these spots.

Practise stage one training three times within one day.
Complete training log at the end of each training session.

## TRAINING LOG FOR RELAXATION EXERCISES:

Use from 1 to 7, with 1= extremely tense and 7= extremely relaxed to show your level of relaxation before the relaxation exercise and after.

STAGE ONE:

| Date and time of practice | Level before relaxing | Level after relaxing |
|---|---|---|
| ---------- | ---------- | ---------- |
| ---------- | ---------- | ---------- |
| ---------- | ---------- | ---------- |

## IMAGERY TRAINING:

The use of imagery, is one of the most powerful tools you can use to achieve peak performance. Visualisation enables you to programme mind and body into a single unit. Your training involves relaxation followed by visualisation. By preparing mind and body, it gives you an extra edge. When visualising always be there as a participant (inside your body) and not as an observer (outside your body).

### STAGE ONE:

1. Pick a quiet place and time, and sit or lie down comfortably.
2. Use centering to achieve a relaxed state.
3. Now, switch on a scene of a familiar activity or situation that is relaxing for you when you are there. It might be a scene involving listening to a favourite record as you sit on a specific chair in your room, or a specific beach you have visited, etc.
4. Let this scene develop, allow yourself to be there and using any senses that make the experience real for you. (Smelling, feeling, hearing, seeing, tasting.) Don't try to force the scene; as any of the details appear, use these details to help the rest of the scene develop.
5. As you experience the relaxing scene, use it to further increase your relaxation. Allow your senses to enable you to

be aware of being in the scene, such that you are truly there. Retain the scene for 30 seconds or so.

6. Now switch off the scene.

7. Return to centering.

8. Switch on the scene again. Retain it, and be there in the scene for about 30 seconds. Then switch off the scene and center.

9. Repeat.

10. End the training session by first moving fingers and feet forward and backward, then opening your eyes.

Repeat stage one imagery twice in one day. You might like to to do one session in the morning and one session at night.

Complete training log at the end of each training session.

## TRAINING LOG FOR IMAGERY EXERCISES:

STAGE ONE:

Session one

1. Rate your level of relaxation at the end of the session, with 1 = extremely tense and 7 = extremely relaxed by circling the appropriate number on the scale.

1_____2_____3_____4_____5_____6_____7

extremely tense — extremely relaxed

2. Rate how vivid and realistic your relaxation scene was by circling the appropriate number on the scale.

1_____2_____3_____4_____5_____6_____7

not real at all — very real

Session two

1. Rate your level of relaxation at the end of the session, with 1 = extremely tense and 7 = extremely relaxed by circling the appropriate number on the scale.

1_____2_____3_____4_____5_____6_____7

extremely tense — extremely relaxed

2. Rate how realistic your relaxation scene was by circling the appropriate number on the scale.

1_____2_____3_____4_____5_____6_____7

not real at all — very real

## STAGE TWO:

## SUCCESSFUL COMPETITION SCENE

In all scenes remember to always to be there as a participant (inside your body) and not an observer (outside your body)

Pick a quiet place and time. Sit or lie down comfortably.

1. Use centering to achieve a relaxed state.
2. Switch on your relaxation scene, and let it come realistically. Be in it for 30 seconds.
3. Switch off the relaxation scene.
4. Use centering.
5. Now switch on a success competition scene - a rugby game in which your body functioned at peak performance level. Let the scene be real and vivid, and be there again. Be in it long enough to experience the major parts of the game or movement ( for example, until the try was scored or until you successfully finished off a movement).
6. Switch off the success scene and center.
7. Switch on the success scene again, experience the competition, especially how well you are functioning.
8. Switch off the scene, center, then end session.
9. Repeat the success scene twice within a twenty minute session.

Practice stage two training twice within one day.Complete training log at the end of each training session.

## TRAINING LOG FOR IMAGERY EXERCISES:

### STAGE TWO:

Session one

1. Rate your level of relaxation at the end of the session, with 1 = extremely tense and 7 = extremely relaxed by circling the appropriate number on the scale.

1_____2_____3_____4_____5_____6_____7

extremely tense — extremely relaxed

2. Rate how real your success competition scene was by circling the appropriate number on the scale.

1_____2_____3_____4_____5_____6_____7

not real at all — very real

Session two

1. Rate your level of relaxation at the end of the session, with 1 = extremely tense and 7 = extremely relaxed by circling the appropriate number on the scale.

1_____2_____3_____4_____5_____6_____7

extremely tense — extremely relaxed

2. Rate how real your success competition scene was by circling the appropriate number on the scale.

1_____2_____3_____4_____5_____6_____7

not real at all — very real

STAGE THREE:

You are now good enough in imagery rehearsal that you can apply it for different goals.
Your goal is to be able to perform effective and accurate front-on tackles.

GOAL: To perform effective and accurate front-on tackles.

DESCRIPTION: When using imagery to practice front-on tackling: See your opponent running directly at you. Concentrate on focusing on the tackle zone. (the area between the knees and the waist). Encourage the opponent to run into your shoulder. Place your head to one side of your opponent and adopt a crouched body position. Keep your head well forward, legs well bent and back rounded. Wrap your arms tightly around the opponents legs and allow his momentum to carry both your bodies back and down. Retain a rounded back and perform a backward roll. Twist in the tackle so you are on top when the tackle is completed. remember when imagining yourself front-on tackling, experience the feel, sights and sounds of it rather than watching yourself perform.

PROCEDURE: Think of a competition or practice scene during which you would perform the front-on tackle.

1. Center.

2. Switch on a rugby game or practice scene, visualising yourself performing a front-on tackle.

3. Notice the way in which your body moves and the general feel as you correctly perform the tackle.

4. Switch off the scene and center.

5. Repeat this scene for a total of two more times. Make certain that the rehearsal involves correctly performing the desired movements. Remember you want to programme correct movements.

6. Switch on the success competition scene, experiencing the success feelings.

7. End the session with centering.

Practice stage three imagery training three times within one day.

Complete training log at the end of each session.

## IMAGERY TRAINING LOGS:

STAGE THREE:

Session one

Rate how realistic and vivid your tackling scene was by circling the appropriate number on the scale.

1_____2_____3_____4_____5_____6_____7

not real at all — very real

Session two

Rate how realistic and vivid your tackling scene was by circling the appropriate number on the scale.

1_____2_____3_____4_____5_____6_____7

not real at all — very real

Session three

Rate how realistic and vivid your tackling scene was by circling the appropriate number on the scale.

1_____2_____3_____4_____5_____6_____7

not real at all — very real

# APPENDIX H

# CONSENT FORM

## DECLARATION OF INFORMED CONSENT

I give my informed consent to participate in this study which looks at psychological training and its effect on rugby performance. I consent to publication of study results so long as the information is anonymous and disguised so that no identification can be made.

1. My participation in this experiment may involve doing psychological training for the preparation for the skill test of a front-on tackle.

2. The general purpose of this study is to look at psychological training techniques effect on rugby performance.

3. I have been informed that there are no more discomforts or risks involved in participating in this research than can be expected from a normal rugby training session.

4. I have been informed that there are no disguised procedures in this experiment. All procedures can be taken at face value.

5. I have been informed that the investigator will gladly answer any questions regarding the procedures of this study when the experimental session is completed.

6. I have been informed that I am free to withdraw from the experiment at any time without penalty of any kind.

---------- ----------

(date) (name of subject)

Angie. Peebles. (researcher) Ken Srongman.(supervisor)

## WHAT WAS THIS ALL FOR?

The purpose of this study was to further our understanding of the relationship between self-confidence and sports performance. The main hypothesis tested by this experiment was that imagery training will improve self-confidence and when self-confidence is improved this will have a positive effect on sports performance.

Three groups participated in the study. Group one subjects underwent relaxation and imagery training. Group two subjects underwent imagery training and group three subjects underwent no formal training.

It was expected that there would be no significant difference in confidence or performance between the two training groups, but both of the training groups were expected to display higher degrees of confidence and better performance, in terms of tackling, than the third group.

If you have any questions, please feel free to ask the experimenter. If you would like a summary of the results when the research is completed, please leave your name and address with the experimenter.

Thank-you for participating.

Angela Peebles.

University of Canterbury.

# APPENDIX I

# DESCRIPTION OF FRONT-ON TACKLE

## GUIDELINES FOR PERFORMING THE FRONT-ON TACKLE:

1. Place head to one side and adopt a crouched position, head well forward, legs well bent and back rounded. Keep eyes open all the time.

2. Encourage the moving opponent to run into your shoulder.

3. Try and get both of your knees on the same side of your head.

4. Wrap your arms tightly around the ball carriers knees and allow his momentum to carry both of your bodies back and down.

5. Retain a rounded back and perform a backward roll.

6. Twist in the tackle as to get on top after tackle.

7. Always be full hearted in effort.